enhanced audio features are available through that particular user's cable system or other delivery system or if the user's home audio equipment is even capable of reproducing the enhanced audio signal sent through the delivery channel.

[0015] Figure 1 illustrates one possible option for optimizing audio reproduction in the invention. More particularly, Figure 1 illustrates a terminal 100, such as a set-top terminal, digital radio, etc., that has a receiver 102, an optional memory 104 and a processor 106. The memory 104 can have portions allocated to program guide database 108 and a channel map database 110.

[0016] A relatively simple approach for including the source characteristic data in the context of an advance analog or digital cable/satellite environment entails adding the control data to program guide data. Providing the source characteristic data in the program guide generally involves adding a parameter related to the delivery channel characteristic data to a channel map 112 used to generate the program guide. The combination of the source characteristic data with the delivery channel characteristic data describes the audio capability of each program and the optimal audio configuration for that program, given the capabilities of the local cable system.

[0017] As is known in the art, the assembled program guide 112 is a structure implemented inside, for example, a set-top terminal 100 that is used to support generation of the program guide (not shown). In one embodiment the system may need to include an additional field in the program guide database 108 for data indicating the audio format of the source program and an additional field in the channel map database 110 to indicate the minimal end-to-end capabilities of the delivery channel. Note that storage of these parameters may require more than one field, depending on the system's design, because many delivery systems include multiple delivery channels having differing capabilities.

[0018] As a specific example, the parameters added to the assembled program guide 112 may include data from the channel map database 110 describing whether the delivery channel is a digital service or an analog service, whether the analog service is only

monophonic capable or also stereo capable, etc. The producer of a source program would provide the program parameters to be stored in the program guide database 108 in addition to the usual program guide information, such as the name of the program and a description of the program episode.

[0019] In practice, if the audio signal is being delivered through a digital delivery channel, the cable system will transmit the signal in, for example, Dolby Digital™ format through the entire transmission path to the user's equipment. If the audio signal is being delivered through an analog delivery channel, however, the cable system will transmit the signal in, for example, stereo mode. Note that if the local cable system has limited audio reproduction capabilities and receives audio signals whose characteristics cannot be maintained by the local cable system's delivery channels, the channel map database 110 also contains data corresponding to the characteristics of that particular cable system and that particular channel so that the processor 106 can generate the next best configuration data taking the delivery channel's limitations into account. For example, if the program guide database indicates that a given program is recorded in stereo and the local cable system provider is unable to support stereo but can optimally support mono, the inventive system configures the user's system to listen to the program in mono.

[0020] Alternatively, the invention can be implemented by adding data fields to a Program and System Information Protocol ("PSIP"), which has been defined as part of the digital television ("DTV") standard in the United States. In one embodiment, the data fields extend an event information table ("EIT") in the system. By way of background, the EIT is similar to the program guide except that the EIT is a standardized way in which program guide information can be delivered. Like the program guide example described above, the data fields or data structures in the PSIP embodiment can act as a configuration guide to convey the configuration data to the receiver in the user's audio reproduction equipment for a particular channel. Note that EITs are also part of the European digital video broadcasting standard and are used to convey program guide information as well.

[0021] Unlike the program guide described above, however, the EIT is a defined party of the MPEG standard and has been included as a part of a government standard and is not proprietary to the cable service or electronic program guide provider and typically contains data only for the specific channel to which the user is tuned because each broadcaster will transmit its own EIT data for its own channel, without creating a central database containing information for all of the channels as in the case of a program guide. As a result, the memory 104 can be eliminated in this case. Because of this difference, the EIT will primarily provide information only for one given channel instead of for all of the channels received by a given subscriber.

[0022] To generate a program guide using PSIP, a DTV receiver can build an extended program guide-like function by scanning all of the available EITs and then building a program guide data base for the available services from the scanned information. More particularly, the system can tune to multiple channels in the system, collect the EIT from each channel and compile the EITs from all of the channels into a single database. Further, to obtain the most complete optimization system for a given subscriber, the data fields should be completed for all services, both analog and digital, available to a given subscriber's receiver. Note that in this embodiment, the broadcaster for each channel would place its own configuration data for its channel in the EIT. As a result, unless all broadcasters for each channel that a given subscriber receives provides the configuration data, the total amount of information provided to the receiver using the EIT may not be as complete as through the program guide embodiment described above.

[0023] The two data control options described above ensures that the processor 106 has the necessary information (i.e., the source characteristic data and delivery channel capability data) to determine the best configuration for optimal audio reproduction while taking any limitations of the delivery channel into account.

[0024] Note that if the service provider delivers optimized audio information to the user's terminal 100, however, the information does not take into account the electronic capabilities and speaker configuration of the user's home audio equipment 116. As noted